

TETRA TECH, INC.

TECHNICAL MEMORANDUM

Basewide Groundwater Monitoring Program Report
Fall 2005 (Q4)
Installation Restoration Program Site 1
Vandenberg Air Force Base, California

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1.0

INTRODUCTION

This report documents the activities and results of the fall 2005 groundwater monitoring at Installation Restoration Program (IRP) Site 1 (Base Exchange Service Station [BXSS]), Operable Unit 6, Vandenberg Air Force Base (AFB), Santa Barbara County, California. Samples were collected at Site 1 by Tetra Tech, Inc. (Tetra Tech) during November 2005. The location of Site 1 is shown on Figure 1.

The groundwater monitoring is being completed in accordance with the Basewide Groundwater Monitoring Program (BGMP) Work Plan (Tetra Tech 2000a), the BGMP Health and Safety Plan (Tetra Tech 2000b), the Basewide Sampling and Analysis Plan (Tetra Tech 2003), the BGMP Quality Assurance Project Plan (QAPP) Addendum (Tetra Tech 2004), the Vandenberg AFB Hazardous Waste Management Plan (U.S. Air Force 2002), and the Waste Management Plan Addendum (Tetra Tech 2005). Regulatory oversight of the work is being performed by the California Department of Toxic Substances Control and Regional Water Quality Control Board—Central Coast Region.

Site background information is summarized in Section 2.0. The scope of work and methodology for groundwater monitoring are presented in Section 3.0. The results of the quarterly monitoring are presented in Section 4.0. Quality Assurance/Quality Control is discussed in Section 5.0. Recommendations for future sampling are presented in Section 6.0.

2.0

BACKGROUND

2.1

SITE DESCRIPTION AND HISTORY

Installation Restoration Program Site 1 is located on the corner of California Boulevard and Herado Avenue in the main cantonment area at Vandenberg AFB. The BXSS has been in operation since 1967 and provides motor vehicle fuel to base residents. The site currently consists of a main office building and three gasoline dispensing islands, six automobile service bays, a four-bay car wash building, and a car wash oil-water separator (OWS).

Four 10,000-gallon, single-walled fuel underground storage tanks (USTs); one 250-gallon, single-walled waste oil UST; associated piping; and the automobile service bay OWS were installed at the BXSS in 1967 (IT Corporation [IT] 1999; Tetra Tech 1996). The automobile service bay OWS was removed in 1999 (Tetra Tech 1999). The car wash OWS, which was installed in 1976, does not produce a hazardous waste stream and is still in place (Tetra Tech 1999). Petroleum products leaked from the single-walled USTs and associated piping into the surrounding soil and groundwater. Two of the 10,000-gallon fuel USTs were subsequently removed and replaced with two 10,000-gallon, double-walled, fiberglass tanks in 1985. The two remaining 10,000-gallon, single-walled USTs and the waste oil UST were replaced with 10,000-gallon, double-walled USTs in 1991. An unknown volume of soil was also excavated during replacement of the tanks (IT 1999).

From 1980 to 1985, Battelle Corporation conducted environmental investigations at Site 1 and installed monitoring wells 1-MW-1 through 1-MW-5. After the single-walled USTs were removed from the site, the Bureau of Reclamation (BR) continued the environmental investigations to determine the extent of soil and groundwater contamination. The BR installed seven monitoring wells (BXS-MW-1 through BXS-MW-7) and drilled nine soil borings. The BR found that the highest concentration of hydrocarbon contaminated soil was in a zone approximately 10 feet below ground surface (bgs) and extending around the USTs, the old pump island, the south half of the BXSS building, and north to the cashier's booth. Pilot tests have since been conducted at the site to assess the effectiveness of site dewatering in conjunction with bioventing of impacted soil. In 1999, IT published a feasibility study to identify,

develop, and analyze remedial action alternatives and to address gasoline, benzene, toluene, ethylbenzene, and xylenes (BTEX), and methyl *tert*-butyl ether (MTBE) detected in soil and groundwater surrounding the former USTs.

A new service station is expected to open in fall 2006, and remediation is scheduled to coincide with the opening of the new station. The existing service station will be demolished at that time. In spring 2004, Water Resource Development Corporation conducted a demonstration project using their Advanced Phase Separation System for MTBE and volatile organic compound (VOC) removal from selected wells. Results from the demonstration project can be obtained by contacting the 30th Space Wing Civil Engineer Squadron, Environmental Flight, IRP (30 CES/CEVR).

2.2 HYDROGEOLOGY

Site 1 is located on an uplifted late-Pleistocene marine terrace within the Burton Mesa physiogeographic province. Groundwater typically occurs unpredictably in small lenses perched on low-permeability layers on Burton Mesa. Site geology consists of poorly graded, fine-grained sand from the surface to approximately 19 to 28 feet bgs. Within the sand, a discontinuous clay layer was encountered. The 2- to 4-foot-thick clay layer is found at depths of 12 to 16 feet and consists of silty clay and clayey sand. The upper clay layer is not expected to act as a barrier to groundwater movement within the perched aquifer due to its discontinuity. A deeper, continuous clay bed, which ranges in thickness from 4 to 5 feet, was encountered at a depth of approximately 19 feet under the east side of the site and extends to a depth of 28 feet northwest of the BXSS (IT 1999). The perched groundwater at Site 1 is typically found from approximately 9 feet bgs to the deep clay bed, which slopes toward the northwest (IT 1999). Sand and gravel encountered during drilling investigations below the deep clay bed were found to be unsaturated.

The shallow saturated zone below Site 1 is unconfined and ranges in thickness from approximately 10 to 21 feet. Based on site groundwater monitoring data collected from 1997 to 2005, groundwater generally flows northwest with elevations ranging from approximately 444 to 451 feet above mean sea level (msl). Groundwater levels measured in November 2005 indicate the groundwater elevation ranged from approximately 445 to 449 feet above msl (Table 1). During fall 2005, the interpreted direction of groundwater flow was to the northwest with a gradient of approximately 0.02 feet per foot (Figure 1).

3.0 SCOPE OF WORK

The work performed during fall 2005 at Site 1 included measuring groundwater elevations, collecting groundwater samples for laboratory analyses, and preparing this report.

3.1 GROUNDWATER MONITORING METHODOLOGY

Eleven wells were sampled at Site 1 during fall 2005. Dedicated MicroPurge pumps and Grundfos pumps were used for purging wells BXS-MW-1 through BXS-MW-3, BXS-MW-5 through BXS-MW-7, and BXS-MW-15 through BXS-MW-19. Duplicate samples were collected from wells BXS-MW-1 and BXS-MW-17. Sampling was conducted in accordance with the documents cited in Section 1.0. Measured groundwater elevations are presented in Table 1, and groundwater contours are illustrated on Figure 1. Purge records are provided in Appendix A.

In general, wells were purged until a minimum of one pump and tubing volume of water (for MicroPurge pumps) or a minimum of three well volumes of water (for Grundfos pumps) were removed and water quality parameters had stabilized. Criteria for determining stabilization are three successive measurements of temperature within ± 1 degree Celsius, pH within ± 0.1 , conductivity within ± 5 percent,

and a turbidity reading of less than 5 nephelometric turbidity units (NTUs). In cases where stability or a turbidity reading of less than 5 NTUs was not obtained, samples were collected after purging a minimum of five pump and tubing volumes of water (for MicroPurge pumps) or a minimum of five well volumes of water (for Grundfos pumps).

3.1.1 MicroPurge Groundwater Sampling

MicroPurge sampling was conducted at monitoring wells BXS-MW-1, BXS-MW-6, and BXS-MW-16 through BXS-MW-18. The pumping rates were calibrated for each well prior to purging to maintain a static water level (i.e., minimal drawdown). Due to high turbidity, wells BXS-MW-1, BXS-MW-6, BXS-MW-17, and BXS-MW-18 were sampled after purging a minimum of five pump and tubing volumes of water.

3.1.2 Standard Groundwater Sampling

A 2-inch Grundfos pump was used for purging groundwater at wells BXS-MW-2, BXS-MW-3, BXS-MW-5, BXS-MW-7, BXS-MW-15, and BXS-MW-19. Wells BXS-MW-3, BXS-MW-5, BXS-MW-15, and BXS-MW-19 were purged dry and sampled after sufficient recharge. Due to high turbidity, well BXS-MW-7 was sampled after purging six well volumes of water. Samples were collected using disposable Teflon bailers.

4.0 RESULTS

Temperature, conductivity, pH, and turbidity were measured in the field during purging. Field measurements are presented in Appendix A. Readings taken immediately prior to sampling are presented in Table 2. Fixed laboratory analyses were performed by EMAX Laboratories, Inc. in Torrance, California. Samples were analyzed according to the work plan (Tetra Tech 2000a) for total petroleum hydrocarbons as gasoline (TPHg) by U.S. Environmental Protection Agency (EPA) method SW8015B and VOCs by EPA method SW8260B. Laboratory analyses and data validation were conducted according to the QAPP Addendum (Tetra Tech 2004). Data validation was performed on 100 percent of the analytical data. Results are presented in Tables 3 and 4, and on Figure 2. Historical data for key contaminants of concern are presented in Table 5 and on Figures 3A and 3B. Figure 3A contains data for key COCs from October 1998 through fall 2003 and Figure 3B contains data for key COCs from spring 2004 to present. Hydrographs showing historical benzene and MTBE concentrations for wells BXS-MW-1, BXS-MW-5, BXS-MW-6, and BXS-MW-18 are presented on Figure 4. Chain-of-custody records are provided in Appendix B.

4.1 TOTAL PETROLEUM HYDROCARBONS

Total petroleum hydrocarbons as gasoline were detected in groundwater collected from six of the eleven wells sampled for TPHg during fall 2005. The highest concentration (75 mg/L), and the only concentration above the Vandenberg AFB Leaking Underground Fuel Tank (LUFT) action level for TPH in groundwater of 1 mg/L, was detected in groundwater from well BXS-MW-2 (Table 3). All TPHg concentrations were within the historical range for each well, with the exception of those detected in groundwater from wells BXS-MW-5 and BXS-MW-6, which were at historical lows and below the LUFT action level for the first time (Table 5). Well BXS-MW-2 was added to the BGMP during spring 2004. Prior to being sampled under the BGMP, groundwater from well BXS-MW-2 had not been analyzed since the September 1996 sampling event by IT.

4.2

VOLATILE ORGANIC COMPOUNDS

Groundwater from seven of the eleven wells sampled for VOCs during fall 2005 contained VOCs at concentrations above the primary maximum contaminant levels (MCLs) (Table 4). The highest concentrations of VOCs were detected in groundwater from wells BXS-MW-2, BXS-MW-5, and BXS-MW-18 (Figure 2). The VOC 1,2-dichloroethane (DCA) was detected above the MCL of 0.5 µg/L in groundwater samples from wells BXS-MW-18 and BXS-MW-19, at concentrations of 1.1 and 0.52 µg/L, respectively. This VOC has not previously been detected in well BXS-MW-18 during the BGMP and was last detected during fall 2004 in groundwater from well BXS-MW-19 at a concentration of 0.7 µg/L. Groundwater from well BXS-MW-2 contained the highest concentration of benzene (4,300 µg/L), ethylbenzene (2,400 µg/L), toluene (16,000 µg/L), *m,p*-xylene (9,700 µg/L), and *o*-xylene (4,000 µg/L). MTBE was not detected in groundwater from this well. Well BXS-MW-2 has had BTEX concentrations above MCLs without corresponding elevated levels of MTBE or *tert*-butanol (TBA) for four quarters. This may indicate the existence of an old leak that precedes the use of MTBE as a gasoline additive. The highest concentration of MTBE (1,400 µg/L) was detected in groundwater from well BXS-MW-5. In addition, benzene was detected above the MCL of 1 microgram per liter (µg/L) in groundwater from wells BXS-MW-1, BXS-MW-5, BXS-MW-6, BXS-MW-7, and BXS-MW-18, and MTBE was detected above the MCL of 13 µg/L in groundwater from wells BXS-MW-1, BXS-MW-5, BXS-MW-6, BXS-MW-7, BXS-MW-18, and BXS-MW-19. Concentrations of *cis*-1,2-DCE, ethylbenzene, total xylenes, and toluene exceeded the respective MCLs of 6, 300, 1,750 (for the sum of total xylenes), and 150 µg/L in groundwater from one or more wells at Site 1. The compound TBA was detected above the Department of Health Services (DHS) notification level of 12 µg/L in groundwater from four wells (Table 4). The highest concentration of TBA (420 µg/L) was detected in groundwater from well BXS-MW-5. The approximate distribution of benzene in groundwater is shown on Figure 3B. No apparent correlation was observed between groundwater elevation and benzene concentration, except in wells BXS-MW-5 and BXS-MW-18 from fall 2004 to fall 2005 (Figure 4). Benzene and MTBE concentrations show a decreasing trend for all wells graphed (Figure 4). Concentrations of key VOCs of concern were within the historical ranges for each well, except for the following COCs, which were detected at historic lows: benzene in groundwater from wells BXS-MW-6 and BXS-MW-7, ethylbenzene in groundwater from wells BXS-MW-5 and BXS-MW-6, MTBE in well BXS-MW-5, toluene in well BXS-MW-6, *m,p*-xylenes in wells BXS-MW-5 and BXS-MW-6, and *o*-xylene in well BXS-MW-6 (Table 5). Toluene concentrations are noteworthy, since the concentrations from spring 2003 through fall 2004 ranged from 4,600 to 5,670 µg/L, while the concentrations during the last two quarters (spring and fall 2005) were detected below the MCL of 150 µg/L at 32 and 0.38 µg/L, respectively.

5.0

QUALITY ASSURANCE/QUALITY CONTROL

All of the analytical data presented in this report have been validated according to the QAPP Addendum (Tetra Tech 2004). The data validation process includes review of sample preservation, temperature, and hold times; detection and quantitation limits; instrument calibration; and equipment blank, trip blank, method blank, laboratory control sample, and matrix spike/matrix spike duplicate. Data validation qualifiers and comments are provided on the data tables to indicate the results of the data validation and to quantitatively indicate the usability of the data. In addition, field sampling records are reviewed to assess the potential for any field conditions to adversely impact the data quality.

There were no significant quality assurance/quality control discrepancies with the data presented in this report. The data quality objectives for the fall 2005 sampling at Site 1 were achieved.

6.0 RECOMMENDATIONS

Semiannual monitoring at Site 1 will continue in spring 2006 according to the Final BGMP Work Plan (Tetra Tech 2000a).

7.0 REFERENCES

IT Corporation (IT)

1999 *Feasibility Study for the Base Exchange Service Station, Operable Unit 6, Vandenberg Air Force Base (AFB), California. Draft Final.* Prepared for the United States Army Corps of Engineers.

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1996 *Compliance Sampling at Tiered Permitted Sites.* 30 CES/CEVCC, Vandenberg AFB, California, Wing Environmental Services Contract, Task Assignment No. 425.

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1999 *Tiered Permit Unit Wastewater Effluent Characterization. Draft* 30 CES/CEV, Vandenberg AFB, California, Wing Environmental Services Contract, Task Assignment No. 19.

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2000a *Basewide Groundwater Monitoring Program Work Plan.* Prepared for 30 CES/CEV, Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson AFB, Colorado. December.

Tetra Tech, Inc.

2000b *Basewide Groundwater Monitoring Program Health and Safety Plan Addendum.* Prepared for 30 CES/CEV, Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson AFB, Colorado. December.

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2003 *Final Basewide Sampling and Analysis Plan.* Prepared for 30 CES/CEV Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarter Air Force Space Command, Peterson Air Force Base, Colorado. September.

Tetra Tech, Inc.

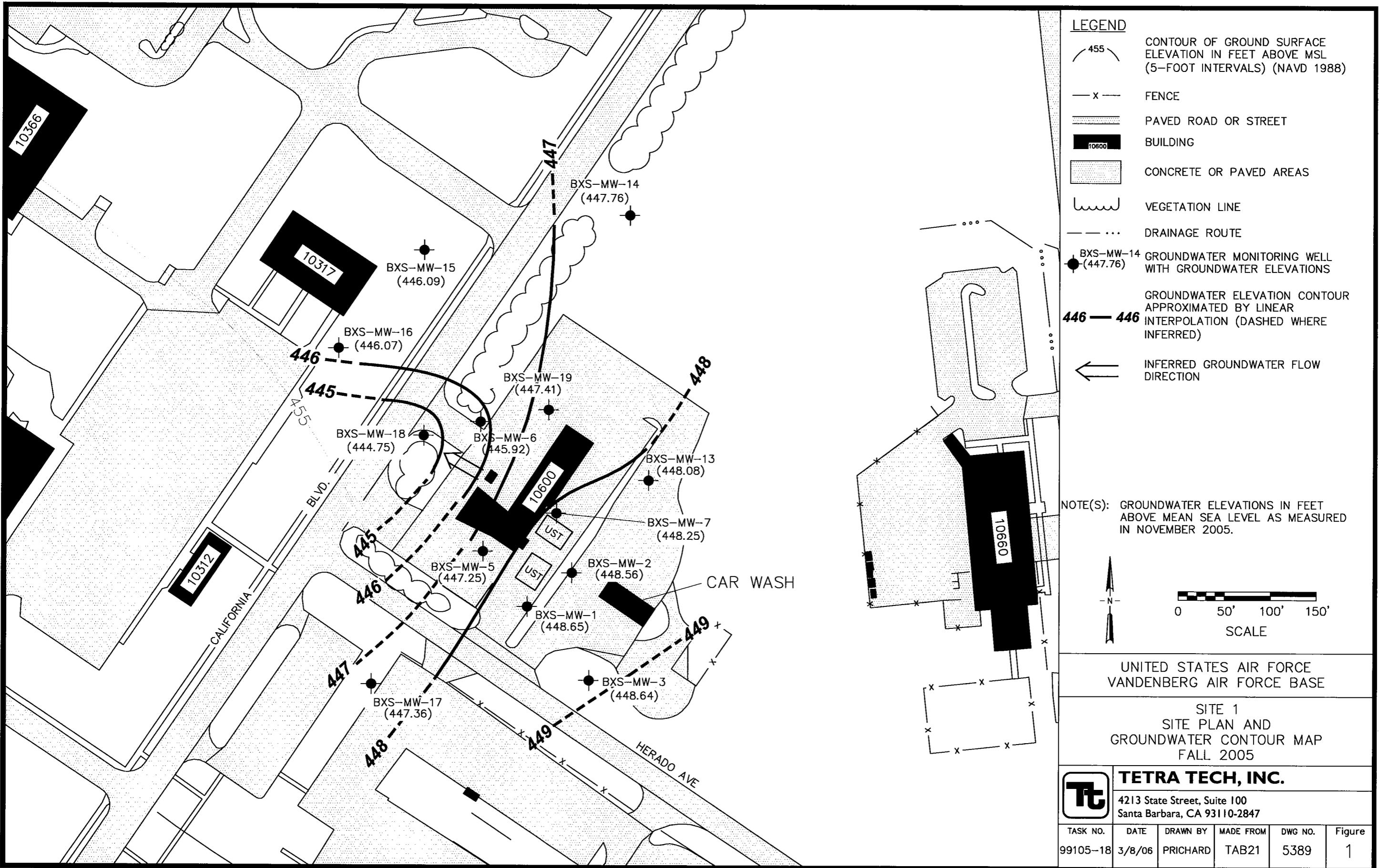
2004 *Basewide Groundwater Monitoring Program Quality Assurance Project Plan Addendum. Final.* Prepared for Department of the Air Force 30 CES/CEVR, 806 13th Street, Suite 116, Vandenberg Air Force Base, California and Department of the Air Force, Air Force Center for Environmental Excellence, DERA Restoration Division, 3300 Sidney Brooks, Brooks City-Base, Texas. July.

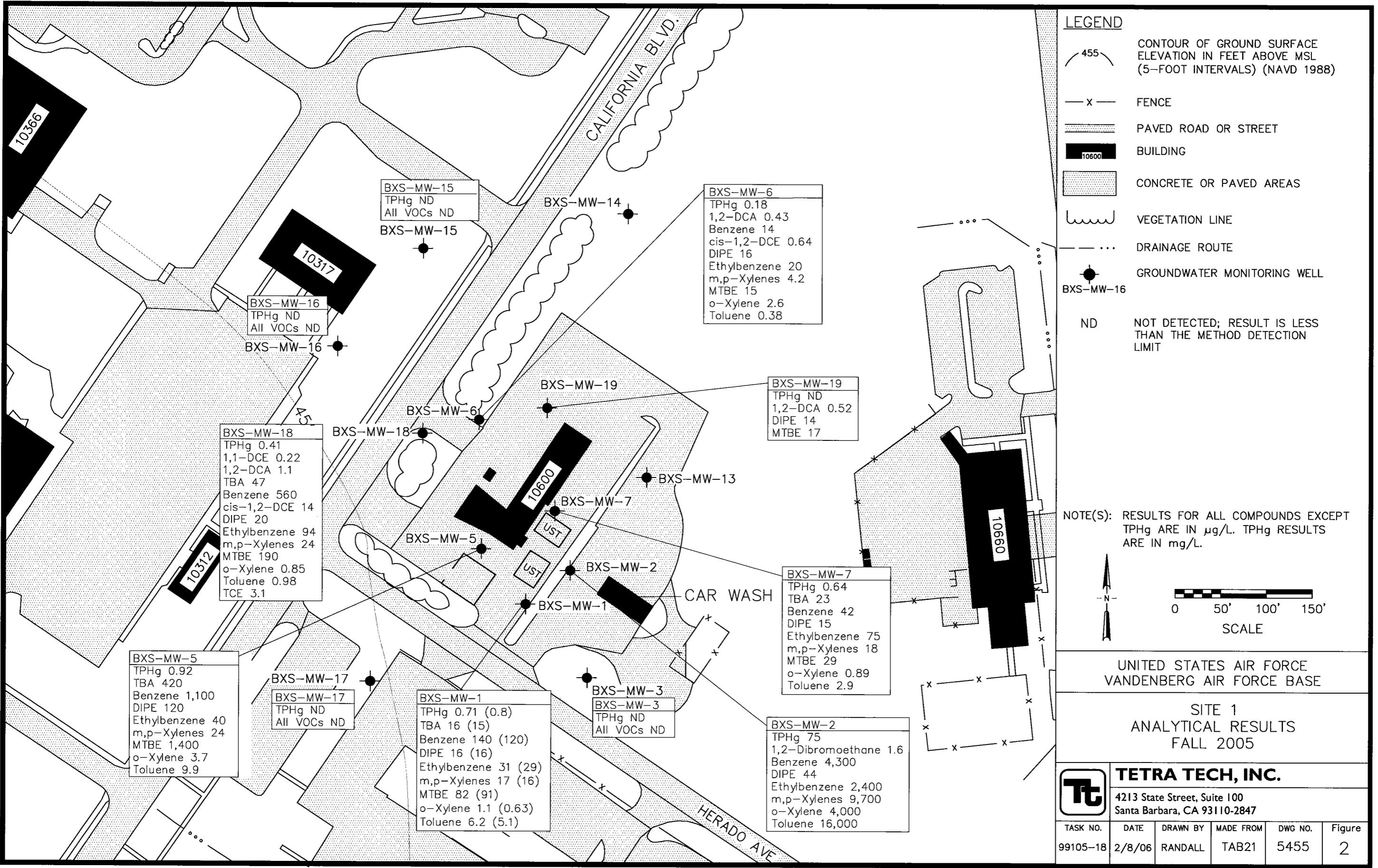
Tetra Tech, Inc.

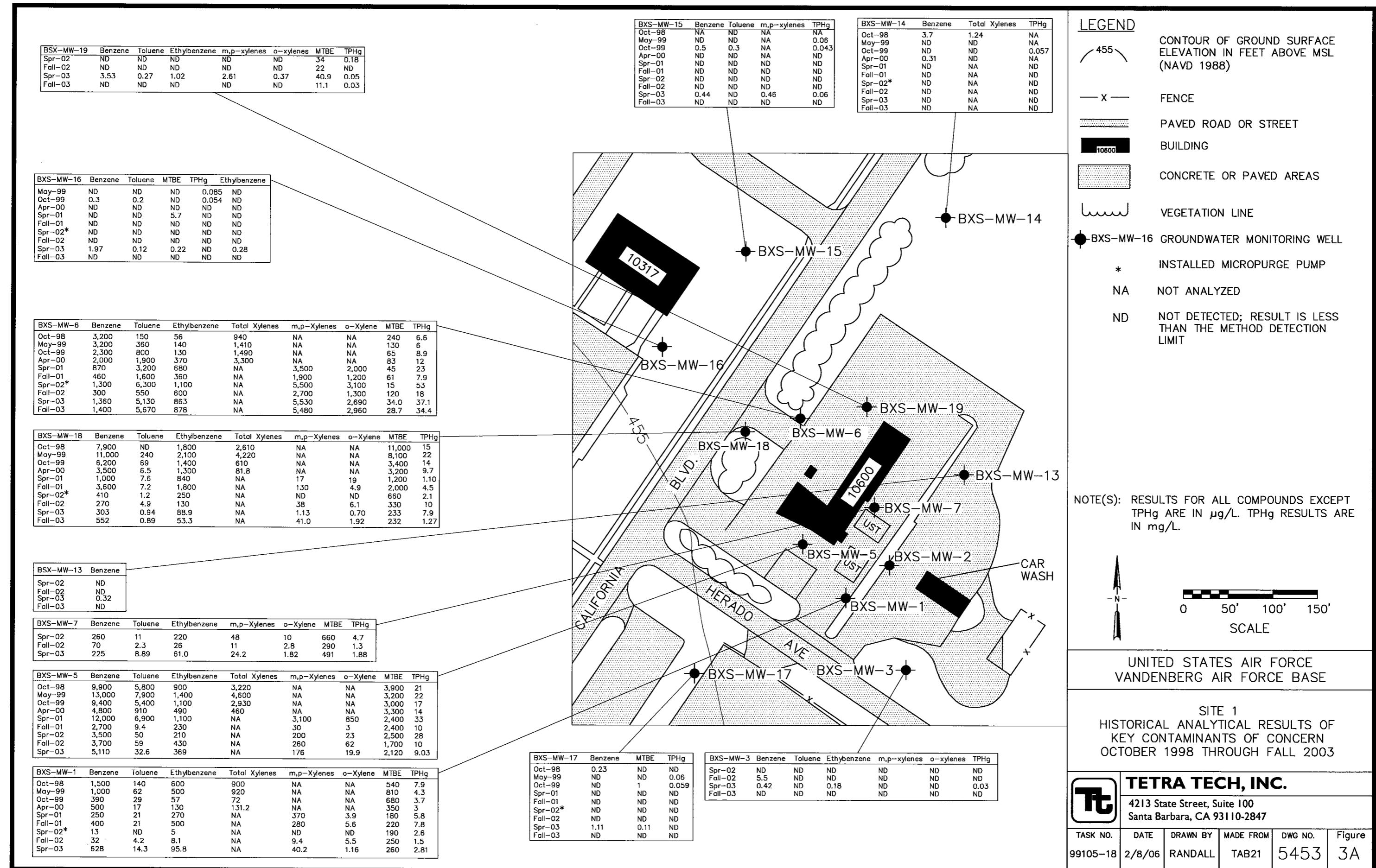
2005 *Waste Management Plan Addendum. Final.* 730 CES/CEVR, Installation Restoration Program, Vandenberg AFB, California, and Headquarters Air Force Space Command, Peterson Air Force Base, Colorado. February.

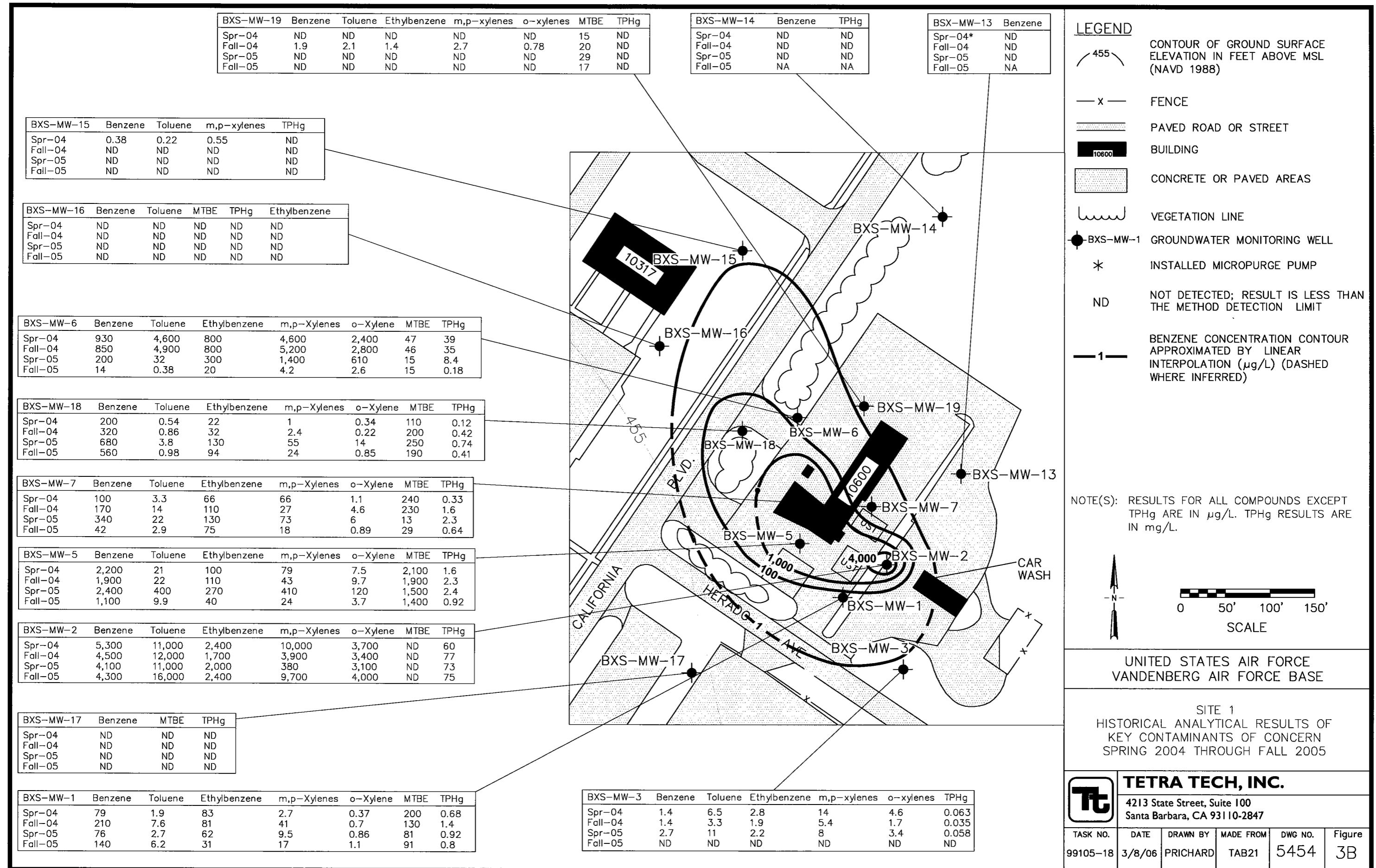
U.S. Air Force

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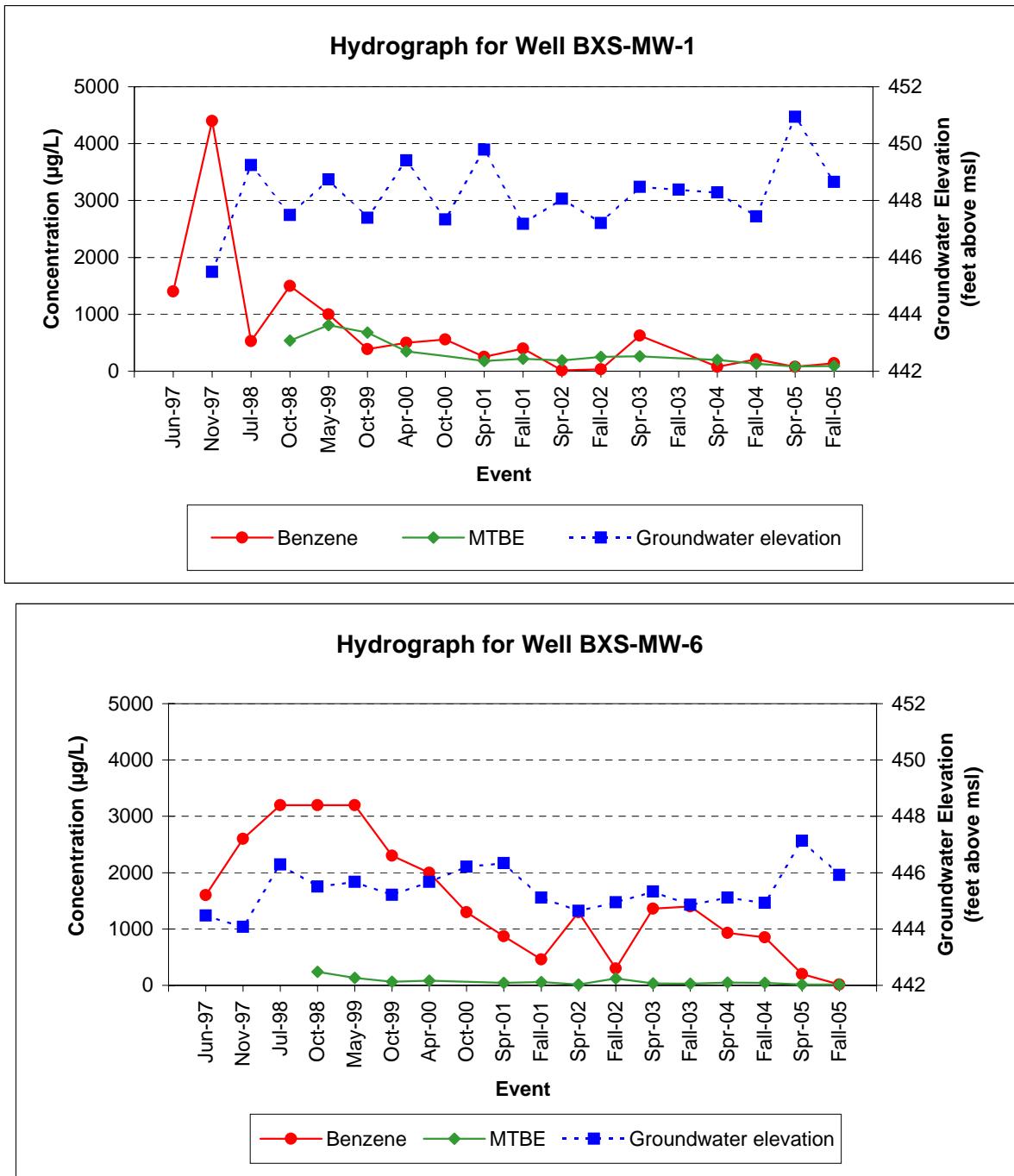


Figure 4. Historical Benzene and MTBE Concentrations at Site 1.

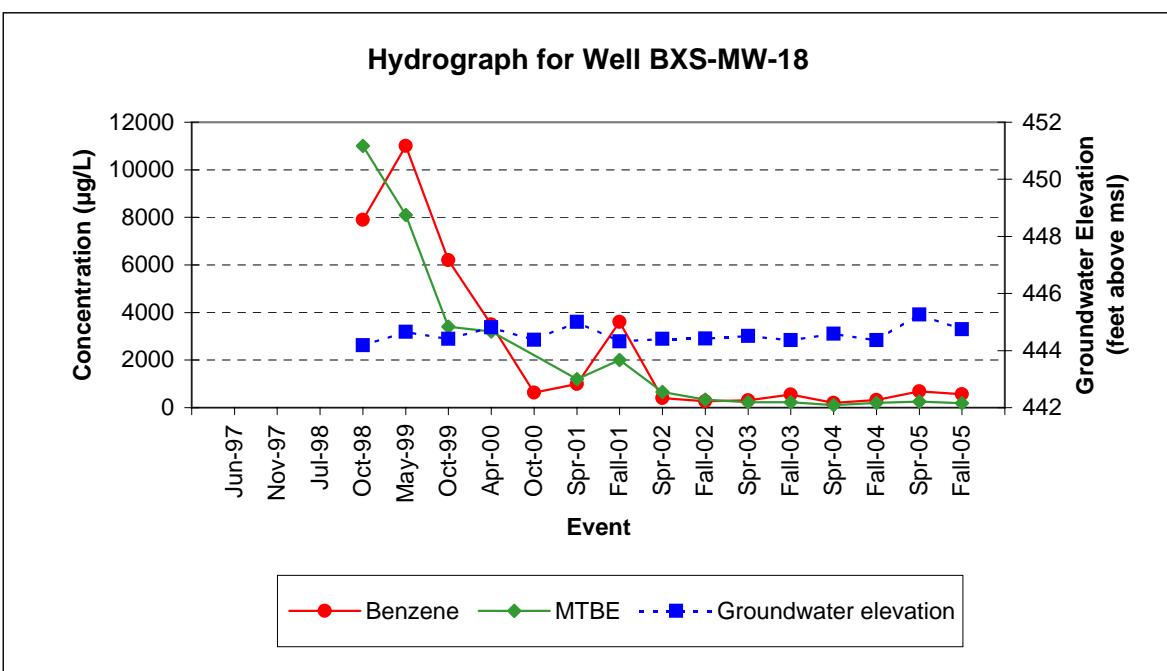
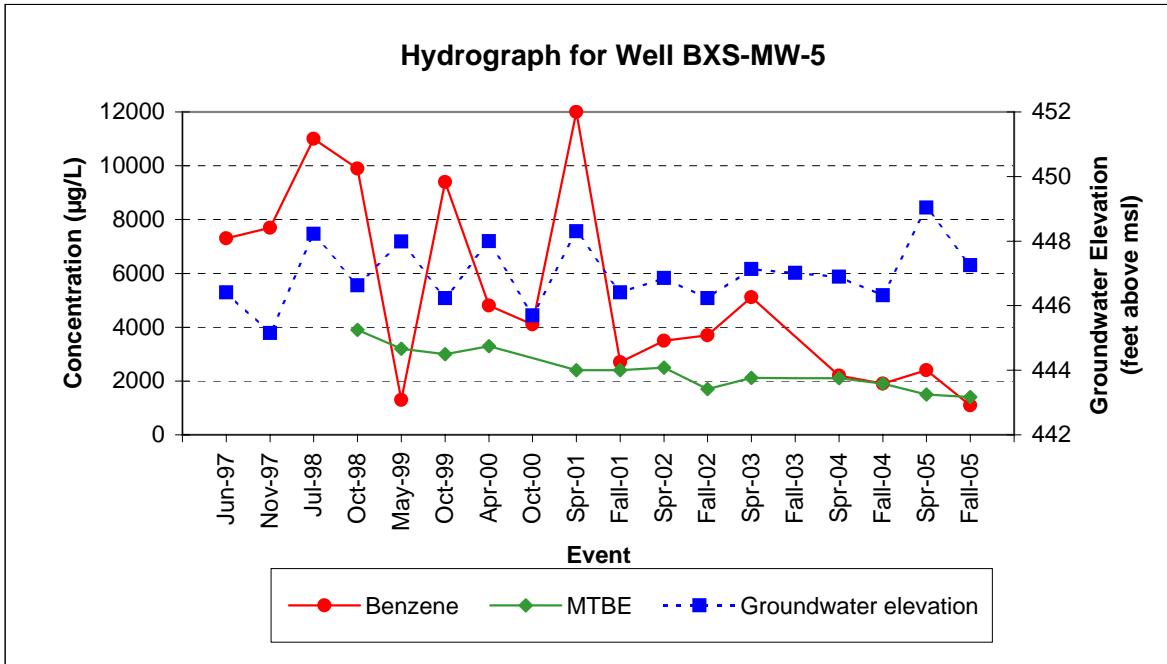


Figure 4 (continued). Historical Benzene and MTBE Concentrations at Site 1.

Table 1
Groundwater Elevations
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Monitoring Well	Top of Casing Elevation (feet above msl)	Date Measured	Groundwater Depth (feet below TOC)		Groundwater Elevation (feet above msl)		
			Fall 2005	Fall 2005	Spring 2005	Fall 2004	Spring 2004
BXS-MW-1	454.09	01-Nov-05	5.44	448.65	450.94	447.44	448.29
BXS-MW-2	453.17	01-Nov-05	4.61	448.56	450.68	447.10	448.19
BXS-MW-3	452.99	01-Nov-05	4.35	448.64	451.26	447.09	448.69
BXS-MW-5	454.61	01-Nov-05	7.36	447.25	449.04	446.32	446.90
BXS-MW-6	453.52	01-Nov-05	7.60	445.92	447.13	444.93	445.11
BXS-MW-7	455.39	01-Nov-05	7.14	448.25	450.12	446.91	447.70
BXS-MW-13	453.81	01-Nov-05	5.73	448.08	450.54	446.69	447.73
BXS-MW-14	454.52	01-Nov-05	6.76	447.76	448.96	445.78	446.18
BXS-MW-15	453.17	01-Nov-05	7.08	446.09	446.25	444.91	445.13
BXS-MW-16	451.63	01-Nov-05	5.56	446.07	446.31	445.10	445.83
BXS-MW-17	453.15	01-Nov-05	5.79	447.36	449.23	447.27	447.57
BXS-MW-18	453.09	01-Nov-05	8.34	444.75	445.26	444.37	444.59
BXS-MW-19	453.99	01-Nov-05	6.58	447.41	448.75	445.80	446.17

Definition(s):

msl - mean sea level
TOC - top of well casing

Table 2
Water Quality Parameters
Fall 2005
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Sampling Location	BXS-MW-1 VBXSMW1	BXS-MW-2 VBXSMW2	BXS-MW-3 VBXSMW3	BXS-MW-5 VBXSMW5	BXS-MW-6 VBXSMW6	BXS-MW-7 VBXSMW7
Sample ID						
Collection Date	21-Nov-05	21-Nov-05	21-Nov-05	22-Nov-05	21-Nov-05	22-Nov-05
Field Parameters¹:						
Temperature (° Celsius)	19.03	21.47	20.15	23.80	18.41	24.68
Conductivity (µmhos/cm)	1,966	995	1,840	1,436	1,712	916
pH	6.71	6.36	6.23	6.24	6.66	6.79
Turbidity (NTUs)	6.20	4.97	17.0	15.4	5.93	12.2

Sampling Location	BXS-MW-15 VBXSMW15	BXS-MW-16 VBXSMW16M	BXS-MW-17 VBXSMW17	BXS-MW-18 VBXSMW18	BXS-MW-19 VBXSMW19
Sample ID					
Collection Date	21-Nov-05	21-Nov-05	21-Nov-05	21-Nov-05	21-Nov-05
Field Parameters¹:					
Temperature (° Celsius)	23.28	17.36	17.39	17.47	22.02
Conductivity (µmhos/cm)	2,465	1,675	608	1,575	2,125
pH	6.64	6.44	6.38	6.17	6.42
Turbidity (NTUs)	2.18	1.50	10.8	7.10	5.07

Definition(s):

µmhos/cm - micromhos per centimeter
 NTU - nephelometric turbidity unit

Note(s):

¹ All field parameters were measured immediately before sampling.

Table 3
TPH in Groundwater
Fall 2005
EPA Method SW8015B (mg/L)
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Sample Location	Sample ID	Collection Date	TPH as Gasoline		
			MDL ¹	0.02	
			PQL ¹	0.1	
BXS-MW-1	VBXSMW1	21-Nov-05	0.71	g	
BXS-MW-1	V99W588 (D)	21-Nov-05	0.8	g	
BXS-MW-2	VBXSMW2	21-Nov-05	75	g	
BXS-MW-3	VBXSMW3	21-Nov-05	0.02	U g	
BXS-MW-5	VBXSMW5	22-Nov-05	0.92	g	
BXS-MW-6	VBXSMW6	21-Nov-05	0.18	g	
BXS-MW-7	VBXSMW7	22-Nov-05	0.64	g	
BXS-MW-15	VBXSMW15	21-Nov-05	0.02	U g	
BXS-MW-16	VBXSMW16M	21-Nov-05	0.02	U g	
BXS-MW-17	VBXSMW17	21-Nov-05	0.02	U g	
BXS-MW-17	V99W589 (D)	21-Nov-05	0.02	U g	
BXS-MW-18	VBXSMW18	21-Nov-05	0.41	g	
BXS-MW-19	VBXSMW19	21-Nov-05	0.02	U g	

Data Validity Qualifier(s):

- U - The analyte was not detected at or above the MDL.

Data Validity Comment(s):

- g - The data met prescribed criteria as detailed in the QAPP.

Definition(s):

- (D) - duplicate sample
- MDL - method detection limit
- mg/L - milligrams per liter
- PQL - practical quantitation limit
- QAPP - Quality Assurance Project Plan
- TPH - total petroleum hydrocarbons

Note(s):

- 1 - Values from QAPP Addendum (Tetra Tech 2004).

Table 4
 VOCs in Groundwater
 Fall 2005
 EPA Method SW8260B (µg/L)
 IRP Site 1 (Base Exchange Service Station)
 Vandenberg AFB, California

Sample Location Sample ID Collection Date		BXS-MW-1 VBXSMW1 21-Nov-05	BXS-MW-1 V99W58 (D) 21-Nov-05	BXS-MW-2 VBXSMW2 21-Nov-05	BXS-MW-3 VBXSMW3 21-Nov-05	BXS-MW-5 VBXSMW5 22-Nov-05
	MDL ¹	PQL ¹	Primary MCL			
1,1-DCE	0.32	1.0	6	2 U g	1 U g	0.2 U g
1,2-Dibromoethane	0.27	0.5	0.05	2 U g	1 U g	0.2 U g
1,2-DCA	0.06	1.0	0.5	2 U g	1 U g	0.2 U g
TBA	4.4	10	N/A	16 J b	15 J b	0.2 U g
Benzene	0.07	0.4	1	140 g	120 g	4,300 g
cis-1,2-DCE	0.21	1.0	6	2 U g	1 U g	0.2 U g
DIPE	0.16	5.0	N/A	16 J b	16 J b	44 J b
Ethylbenzene	0.12	1.0	300	31 g	29 g	2,400 g
m,p-Xylenes	0.25	2.0	1,750 ²	17 J b	16 g	9,700 g
MTBE	0.3	1.0	13 ³	82 g	91 g	0.2 U g
o-Xylene	0.13	1.0	1,750 ²	1.1 J b	0.63 J b, q	4,000 g
Toluene	0.11	1.0	150	6.2 J b	5.1 g	16,000 g
TCE	0.18	1.0	5	2 U g	1 U g	0.2 U g
All other target analytes	N/A	N/A	ND	ND	ND	ND

Table 4
VOCS in Groundwater
Fall 2005
EPA Method SW8260B (µg/L)
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Sample Location	Sample ID	Collection Date	MDL ¹	PQL ¹	Primary MCL	BXS-MW-6 VBXSMW6 21-Nov-05	BXS-MW-7 VBXSMW7 22-Nov-05	BXS-MW-15 VBXSMW15 21-Nov-05	BXS-MW-16 VBXSMW16M 21-Nov-05
1,1-DCE	0.32	1.0	6	0.2	U g	0.2	U g	0.2	U g
1,2-Dibromoethane	0.27	1	0	0.2	U g	0.2	U g	0.2	U g
1,2-DCA	0.06	1.0	0.5	0.43	J q	0.2	U g	0.2	U g
TBA	4.4	10.0	N/A	5	U g	23	g	5	U g
Benzene	0.07	0.4	1	14	g	42	g	0.2	U g
cis-1,2-DCE	0.21	1.0	6	0.64	J q	0.2	U g	0.2	U g
DIPE	0.16	5.0	N/A	16	g	15	g	0.2	U g
Ethylbenzene	0.12	1.0	300	20	g	75	g	0.2	U g
<i>m,p</i> -Xylenes	0.25	2.0	1,750 ²	4.2	g	18	g	0.5	U g
MTBE	0.3	1.0	13 ³	15	g	29	g	0.2	U g
<i>o</i> -Xylene	0.13	1.0	1,750 ²	2.6	g	0.89	J q	0.2	U g
Toluene	0.11	1.0	150	0.38	J q	2.9	g	0.2	U g
TCE	0.18	1.0	5	0.2	U g	0.2	U g	0.2	U g
All other target analytes	N/A	N/A	ND	ND	ND	ND	ND	ND	ND

Table 4
VOCs in Groundwater
Fall 2005
EPA Method SW8260B (µg/L)
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Sample Location	Sample ID	Collection Date	MDL ¹	PQL ¹	Primary MCL	BXS-MW-17 VBXSMW17 21-Nov-05	BXS-MW-17 V99W589(D) 21-Nov-05	BXS-MW-18 VBXSMW18 21-Nov-05	BXS-MW-19 VBXSMW19 21-Nov-05
1,1-DCE	0.32	1.0	6	0.2	U g	0.2	U g	0.22	J q
1,2-Dibromoethane	0.27	0.5	0.05	0.2	U g	0.2	U g	0.2	U g
1,2-DCA	0.06	1.0	0.5	0.2	U g	0.2	U g	0.52	J q
TBA	4.4	10	N/A	5	U g	5	U g	47	g
Benzene	0.07	0.4	1	0.2	U g	0.2	U g	560	g
cis-1,2-DCE	0.21	1.0	6	0.2	U g	0.2	U g	14	g
DIPE	0.16	5.0	N/A	0.2	U g	0.2	U g	20	g
Ethylbenzene	0.12	1.0	300	0.2	U g	0.2	U g	94	g
<i>m,p</i> -Xylenes	0.25	2.0	1,750 ²	0.5	U g	0.5	U g	24	g
MTBE	0.3	1.0	13 ³	0.2	U g	0.2	U g	190	g
<i>o</i> -Xylene	0.13	1.0	1,750 ²	0.2	U g	0.2	U g	0.85	J q
Toluene	0.11	1.0	150	0.2	U g	0.2	U g	0.98	J q
TCE	0.18	1.0	5	0.2	U g	0.2	U g	3.1	g
All other target analytes	N/A	N/A	ND	ND	ND	ND	ND	ND	ND

Table 4
VOCS in Groundwater
Fall 2005
EPA Method SW8260B (µg/L)
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Data Validity Qualifier(s):	J	- The analyte was positively identified and the result is usable; however, the analyte concentration is an estimated value.
	U	- The analyte was not detected at or above the MDL.
Data Validity Comment(s):		
	b	- The surrogate spike recovery was outside quality control criteria.
	g	- The data met prescribed criteria as detailed in the QAPP.
	q	- The analyte detection was below the PQL.
Definition(s):	(D)	- duplicate sample
	DCA	- dichloroethane
	DCE	- dichloroethene
	DIPE	- diisopropyl ether
	MCL	- maximum contaminant level
	MDL	- method detection limit
	µg/L	- micrograms per liter
	MTBE	- methyl <i>tert</i> -butyl ether
	N/A	- not applicable
	ND	- not detected; result is less than the MDL
	PQL	- practical quantitation limit
	QAPP	- Quality Assurance Project Plan
	TBA	- <i>tert</i> -butanol
	TCE	- trichloroethene
Note(s):		
Bold type indicates results that were above the MCL. The California Department of Health Services notification level for TBA is 12 µg/L.		
1 - Values from QAPP Addendum (Tetra Tech 2004).		
2 - MCL of 1,750 µg/L applies to sum of <i>m</i> -xylene, <i>o</i> -xylene, and <i>p</i> -xylene.		
3 - The secondary MCL for MTBE is 5 µg/L.		

Table 5

Summary of Key Contaminants of Concern
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

	Oct-98	May-99	Oct-99	Apr-00	Spr-01	Fall-01	Benzene (µg/L) ^a						
							400	13	32	628	NA	79	210
BXS-MW-1	1,500	1,000	390	500	250	400	5	8.1	95.8	NA	83	81	62
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,300	4,500	4,100
BXS-MW-3	NA	NA	NA	NA	NA	NA	ND	5.5	0.42	ND	1.4	1.4	2.7
BXS-MW-5	9,900	13,000	9,400	4,800	12,000	2,700	3,500	3,700	5,110	NA	2,200	1,900	2,400
BXS-MW-6	3,200	3,200	2,300	2,000	870	460	1,300	300	1,360	1,400	930	850	200
BXS-MW-7	NA	NA	NA	NA	NA	NA	260	70	225	NA	100	170	340
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	0.32	ND	ND	ND	ND
BXS-MW-14	3.7	ND	ND	0.31	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-15	NA	ND	0.5	ND	ND	ND	ND	ND	0.44	ND	0.38	ND	ND
BXS-MW-16	NA	ND	0.3	ND	ND	ND	ND	ND	1.97	ND	ND	ND	ND
BXS-MW-17	0.23	ND	NA	ND	ND	ND	ND	ND	1.11	ND	ND	ND	ND
BXS-MW-18	7,900	11,000	6,200	3,500	1,000	3,600	410	270	303.0	552	200	320	680
BXS-MW-19	NA	NA	NA	NA	NA	NA	ND	ND	3.53	ND	ND	1.9	ND
Ethylbenzene (µg/L) ^b													
BXS-MW-1	600	500	57	130	270	500	5	8.1	95.8	NA	83	81	62
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,400	1,700	2,000
BXS-MW-3	NA	NA	NA	NA	NA	NA	ND	0.18	ND	2.8	1.9	2.2	ND
BXS-MW-5	900	1,400	1,100	490	1,100	230	210	430	369	NA	100	110	270
BXS-MW-6	56	140	130	370	680	360	1,100	600	863	878	800	800	300
BXS-MW-7	NA	NA	NA	NA	NA	NA	220	26	61.0	NA	66	110	130
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
BXS-MW-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-15	NA	ND	ND	ND	ND	ND	ND	ND	0.27	ND	ND	ND	ND
BXS-MW-16	NA	ND	ND	ND	ND	ND	ND	ND	0.28	ND	ND	ND	ND
BXS-MW-17	ND	ND	NA	ND	ND	ND	ND	ND	0.15	ND	ND	ND	ND
BXS-MW-18	1,800	2,100	1,400	1,300	840	1,800	250	130	88.9	53.3	22	32	130
BXS-MW-19	NA	NA	NA	NA	NA	NA	ND	ND	1.02	ND	ND	1.4	ND

Table 5
Summary of Key Contaminants of Concern
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

	MTBE ($\mu\text{g/L}$) ^c										Toluene ($\mu\text{g/L}$) ^d			
	Oct-98	May-99	Oct-99	Apr-00	Spr-01	Fall-01	Spr-02	Fall-02	Spr-03	Fall-03	Spr-04	Fall-04	Spr-05	Fall-05
BXS-MW-1	540	810	680	350	180	220	190	250	260	NA	200	130	81	91
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
BXS-MW-3	0.5	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
BXS-MW-5	3,900	3,200	3,000	3,300	2,400	2,400	2,500	1,700	2,120	NA	2,100	1,900	1,500	1,400
BXS-MW-6	240	130	65	83	45	61	15	120	34.0	28.7	47	46	15	15
BXS-MW-7	NA	NA	NA	NA	NA	NA	NA	660	290	491	NA	240	230	13
BXS-MW-13	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
BXS-MW-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
BXS-MW-15	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-16	NA	ND	ND	ND	5.7	ND	ND	ND	0.22	ND	ND	ND	ND	ND
BXS-MW-17	ND	ND	1	NA	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND
BXS-MW-18	11,000	8,100	3,400	3,200	1,200	2,000	660	330	233	232	110	200	250	190
BXS-MW-19	NA	NA	NA	NA	NA	NA	34	22	40.9	11.1	15	20	29	17
	MTBE ($\mu\text{g/L}$) ^c										Toluene ($\mu\text{g/L}$) ^d			
	Oct-98	May-99	Oct-99	Apr-00	Spr-01	Fall-01	Spr-02	Fall-02	Spr-03	Fall-03	Spr-04	Fall-04	Spr-05	Fall-05
BXS-MW-1	140	62	29	17	21	21	ND	4.2	14.3	NA	1.9	7.6	2.7	6.2
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	11,000	12,000	11,000	16,000
BXS-MW-3	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	6.5	3.3	11	ND
BXS-MW-5	5,800	7,900	5,400	910	6,900	9.4	50	59	32.6	NA	21	22	400	9.9
BXS-MW-6	150	360	800	1,900	3,200	1,600	6,300	550	5,130	5,670	4,600	4,900	32	0.38
BXS-MW-7	NA	NA	NA	NA	NA	NA	11	2.3	8.89	NA	3.3	14	22	2.9
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA
BXS-MW-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
BXS-MW-15	NA	ND	0.3	ND	ND	ND	ND	ND	ND	ND	0.22	ND	ND	ND
BXS-MW-16	NA	ND	0.2	ND	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND
BXS-MW-17	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-18	ND	240	69	6.5	7.6	7.2	1.2	4.9	0.94	0.89	0.54	0.86	3.8	0.98
BXS-MW-19	NA	NA	NA	NA	NA	NA	ND	ND	0.27	ND	ND	2.1	ND	ND

Table 5
Summary of Key Contaminants of Concern
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

	Total Xylenes (µg/L) ^e				m,p-Xylene (µg/L) ^f				o-Xylene (µg/L) ^f					
	Oct-98	May-99	Oct-99	Apr-00	Spr-01	Fall-01	Spr-02	Fall-02	Spr-03	Fall-03	Spr-04	Fall-04	Spr-05	Fall-05
BXS-MW-1	900	920	72	131.2	370	280	ND	9.4	40.2	NA	2.7	41	9.5	17
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10,000	3,900	380	9,700
BXS-MW-3	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	14	5.4	8	ND
BXS-MW-5	3,220	4,600	2,930	460	3,100	30	200	260	176	NA	79	43	41.0	24
BXS-MW-6	940	1,410	1,490	3,300	3,500	1,900	5,500	2,700	5,530	5,480	4,600	5,200	1,400	4.2
BXS-MW-7	NA	NA	NA	NA	NA	NA	NA	48	11	24.2	NA	6.6	27	73
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA
BXS-MW-14	1.24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
BXS-MW-15	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.46	ND	ND	ND
BXS-MW-16	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-17	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-18	2,610	4,220	610	81.8	17	130	ND	38	1.13	41.0	1	2.4	55	24
BXS-MW-19	NA	NA	NA	NA	NA	NA	ND	ND	2.61	ND	ND	2.7	ND	ND
<hr/>													<hr/>	
Total Xylenes (µg/L) ^e				Spr-01	Fall-01	Spr-02	Fall-02	Spr-03	Fall-03	Spr-04	Fall-04	Spr-05	Fall-05	
BXS-MW-1	900	920	72	131.2	3.9	5.6	ND	5.5	1.16	NA	0.37	0.7	0.86	1.1
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3,700	3,400	3,100	4,000
BXS-MW-3	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	4.6	1.7	3.4	ND
BXS-MW-5	3,220	4,600	2,930	460	850	3	23	62	19.9	NA	7.5	9.7	120	3.7
BXS-MW-6	940	1,410	1,490	3,300	2,000	1,200	3,100	1,300	2,690	2,960	2,400	2,800	610	2.6
BXS-MW-7	NA	NA	NA	NA	NA	NA	10	2.8	1.82	NA	1.1	4.6	6	0.89
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA
BXS-MW-14	1.24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
BXS-MW-15	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-16	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-17	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-18	2,610	4,220	610	81.8	19	4.9	ND	6.1	0.70	1.92	0.34	0.22	14	0.85
BXS-MW-19	NA	NA	NA	NA	NA	NA	ND	ND	0.37	ND	ND	0.78	ND	ND

Table 5
Summary of Key Contaminants of Concern
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

	TPH as Gasoline (mg/L)													
	Oct-98	May-99	Oct-99	Apr-00	Spr-01	Fall-01	Spr-02	Fall-02	Spr-03	Fall-03	Spr-04	Fall-04	Spr-05	Fall-05
BXS-MW-1	7.9	4.3	3.7	3	5.8	7.8	2.6	1.5	2.81	NA	0.68	1.4	0.92	0.8
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	ND	0.03	NA	60	77	73	75
BXS-MW-3	50	NA	NA	NA	NA	NA	ND	ND	0.063	0.035	0.058	ND	ND	ND
BXS-MW-5	21	22	17	14	33	10	28	10	9.03	NA	1.6	2.3	2.4	0.92
BXS-MW-6	6.6	6	8.9	12	23	7.9	53	18	37.1	34.4	39	35	8.4	0.18
BXS-MW-7	NA	NA	NA	NA	NA	NA	4.7	1.3	1.88	NA	0.33	1.6	2.3	0.64
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	NA
BXS-MW-14	NA	NA	0.057	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
BXS-MW-15	NA	0.06	0.043	ND	ND	ND	ND	ND	0.06	ND	ND	ND	ND	ND
BXS-MW-16	NA	0.085	0.054	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-17	ND	0.06	0.059	NA	ND	ND								
BXS-MW-18	15	22	14	9.7	10	7.9	4.5	2.1	1.10	1.27	0.12	0.42	0.74	0.41
BXS-MW-19	NA	NA	NA	NA	NA	0.18	ND	0.05	0.03	ND	ND	ND	ND	ND

Definition(s):

- µg/L - micrograms per liter
- mg/L - milligrams per liter
- MTBE - methyl *tert*-butyl ether
- NA - not analyzed
- ND - not detected; result is less than the method detection limit.
- TPH - total petroleum hydrocarbons

Note(s):

- Bold type indicates results that were above the MCL.
- a - The MCL for benzene is 1 µg/L.
- b - The MCL for ethylbenzene is 300 µg/L.
- c - The MCL for MTBE is 13 µg/L.
- d - The MCL for toluene is 150 µg/L.
- e - The MCL for total xylenes is 1,750 µg/L.
- f - MCL of 1,750 µg/L applies to sum of *m*-xylene, *o*-xylene, and *p*-xylene.



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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

Page 1 of 1

DATE 11/21/05 SITE NUMBER 1
PROGRAM NAME B6-maf TRIP BLANK I.D. V BX5/1142
MONITORING WELL IDENTIFICATION BX5-mw-2 DUPLICATE I.D. / COLLECTION TIME -
SAMPLE I.D. V BX5mw2 STATIC WATER LEVEL (ft btoc) 4.78 TOTAL WELL DEPTH (ft btoc) 24.0
WATER COLUMN (feet) 2.4 Casing Diameter (in) 7.8 BAILER BOX # 197
WELL VOLUME (V) (gals) 3 V(gals)

Time	Activity	Water Level (ft btoc)	Pump Depth (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (gals)	Well Volumes Purged	Flow Rate (GPM)			
													Initial	Vented to	Initial	Vented to
1425	Arrived at well	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1432	Begin Purge	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1437	8.51	21.46	9.73	6.30	16.9	4.40	6.3	Cloudy	2.5	1.0	—	—	—	—	—	0.5
1442	8.80	21.39	9.94	6.40	5.24	0.69	28.7	Clear	5.0	2.0	—	—	—	—	—	—
1447	9.57	21.47	9.95	6.36	4.97	0.55	41.6	Clear	7.5	3.0	—	—	—	—	—	—
1448	End Purge	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1505	Sample	6.50	20.15	8.75	6.43	20.23	3.25	—	112.3	Clear	—	—	—	—	—	—
1525	Vacated well	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

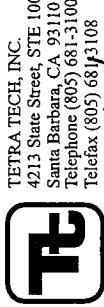
Fe+2 (ppm) — Taken from first bailey immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 6.50 FILTER LOT #: —

Comments:

X:\LRP\Drive\Refile\Work\Refile\Coordinate\Automation\Tools\SO\Refid\Date\Log_Sheet_Groundflow.xls	File
Temperature $\pm 1^\circ \text{C}$ (18 F) pH ± 0.1	Conductivity $\pm 5\%$ Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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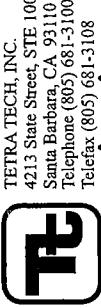
GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

Page 1 of 1

DATE	SITE NUMBER	PURGING DEVICE	2 nd SUBMERSIBLE GRUNDfos PUMP											
11/21/05	1	SAMPLING DEVICE	DISPOSABLE TEFLON BAILER											
PROGRAM NAME	VBXSTB1/42	PID READING IN CASING (ppm)	(initial) 0.0 (vented to) 0.0											
MONITORING WELL IDENTIFICATION	BX5-mw-3	PID READING IN BREATHING ZONE (ppm)	(initial) 0.0 (vented to) 0.0											
SAMPLE I.D.	DUPPLICATE I.D. / COLLECTION TIME	SAMPLER'S SIGNATURE	<i>B. J. Decker</i>											
STATIC WATER LEVEL (ft btoc)	4.91	TOTAL WELL DEPTH (ft btoc)	21.00											
WATER COLUMN (feet)	16.08	CASING DIAMETER (in)	8.5											
WELL VOLUME (V) (gals)	2.8	BAILER BOX #	196											
Time	Activity	Water Level (ft btoc)	Pump Depth (ft btoc)	Temp (Deg. C)	EC (µhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (gals)	Well Volumes Purged	Flow Rate (GPM)	
1330	Arrived at well	—	—	—	—	—	—	—	—	—	—	—	—	
1338	Begin Purge	—	20.5	—	—	—	—	—	—	—	—	—	0.5	
1343	5.27	22.35	4.98	7.19	6.70	9.14	72.3	Clear	2.5	0.9	—	—	—	
1348	11.02	20.69	1.924	6.94	24.4	2.20	67.5	—	5.0	1.8	—	—	—	
1353	3.78	20.95	1.956	6.28	25.3	1.45	57.3	—	0.0	2.7	—	—	—	
1358	*	20.43	1.905	6.24	24.9	1.95	53.2	—	5.0	3.6	—	—	—	
1403	*	20.15	1.940	6.23	17.0	1.53	54.0	—	20.0	4.5	—	—	—	
1405	well DR4	—	—	—	—	—	—	—	—	—	—	—	—	
1415	Sample	18.58	17.52	6.48	117	3.91	2543	Clear	—	—	—	—	—	—
	Fe+2 (ppm)	Taken from first bailer immediately before sampling.												
	WATER LEVEL (ft btoc) AT TIME OF SAMPLING:	17.60 FILTER LOT # ~												
	Comments:	* = well can't get fast check value												

PARAMETERS FOR WATER QUALITY STABILIZATION		
Temperature	+1 °C (1.8 F)	Conductivity ± 5%
pH	± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

Page 1 of 1

DATE 1/12/2005 SITE NUMBER 1
PROGRAM NAME B6MP TRIP BLANK I.D. VITB1146
MONITORING WELL IDENTIFICATION 8xs-mw-5
SAMPLE I.D. VBXSNSS DUPLICATE I.D. / COLLECTION TIME —
STATIC WATER LEVEL (ft btoc) 7.46 TOTAL WELL DEPTH (ft btoc) 21.5
WATER COLUMN (feet) 14.0 CASTING DIAMETER (in) 7.2 BAILER BOX # 197
WELL VOLUME (V) (gals) 3 V (gals)

Time	Activity	Water Level (ft btoc)	Pump Depth (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (gals)	Well Volumes Purged	Flow Rate (GPM)
1055	Arrived at well	—	—	—	—	—	—	—	—	—	—	—	—
1055	Begin Purge	—	21.0	—	—	—	—	—	—	—	—	—	0.5
1110	13.12	23.08	1348	621	54.9	4.50	102.2	Cloudy	2.5	1.0	—	—	
1115	16.65	23.21	1451	645	22.1	2.05	79.9	—	5.0	2.0	—	—	
1120	18.28	23.80	1436	6.24	15.4	1.98	56.0	—	7.5	3.0	—	—	
1122	Well DR 4	—	—	—	—	—	—	—	—	—	—	—	
1130	Sample	16.53	—	26.39	1421	9.651	97.0	42.8	Cloudy	—	—	—	
1132	Reading	16.53	—	26.39	1421	9.651	97.0	42.8	Cloudy	—	—	—	
1135	Vacated well	—	—	—	—	—	—	—	—	—	—	—	

Fe+2 (ppm) — Taken from first baile immediately before sampling.

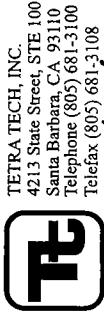
WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 16.53 FILTER LOT # —

Comments: —

X:\JRP\DriveField\Workfield\CoordinationForms\ToolBox\Tetra\Data_Log_Sheet_GroundSws.mif
2" SUBMERSIBLE GRUNDFOS PUMP
PURGING DEVICE —
SAMPLING DEVICE —
DISPOSABLE TEFLON BAILER

PID READING IN CASTING (ppm) (initial) 334 (vented to) 15.1
PID READING IN BREATHING ZONE (ppm) (initial) 0.0 (vented to) 0.0

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

Page 1 of 1

DATE 11/21/05 SITE NUMBER /
PROGRAM NAME BGMP TRIP BLANK I.D. VBXSTB1142
MONITORING WELL IDENTIFICATION BXS-MW-6
SAMPLE I.D. VBXSNWG DUPLICATE I.D. / COLLECTION TIME —
STATIC WATER LEVEL (ft btoc) 7.82 TOTAL WELL DEPTH (ft btoc) 16.6
WATER COLUMN (feet) 8.8 TUBING DIAMETER (in) 3/8
PUMP & TUBING (V) (L) 0.59 SV (L) 2.95

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (umhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (L/PM)
1040	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1053	Begin Purge	—	—	—	—	—	—	—	—	—	—	—
1058		<u>8.13</u>	<u>18.31</u>	<u>2100</u>	<u>6.60</u>	<u>20.8</u>	<u>0.35</u>	<u>-152.0</u>	<u>clear</u>	<u>0.72</u>	<u>1.22</u>	<u>0.24</u>
1101		<u>8.19</u>	<u>18.29</u>	<u>1919</u>	<u>6.62</u>	<u>12.6</u>	<u>0.25</u>	<u>-152.8</u>	<u>clear</u>	<u>1.44</u>	<u>2.44</u>	
1104		<u>8.22</u>	<u>18.34</u>	<u>1784</u>	<u>6.64</u>	<u>9.46</u>	<u>0.18</u>	<u>-155.3</u>	<u>clear</u>	<u>2.16</u>	<u>3.66</u>	
1107		<u>8.24</u>	<u>18.38</u>	<u>1754</u>	<u>6.65</u>	<u>8.95</u>	<u>0.15</u>	<u>-156.4</u>	<u>clear</u>	<u>2.88</u>	<u>4.98</u>	
1110		<u>8.24</u>	<u>18.41</u>	<u>1712</u>	<u>6.66</u>	<u>5.93</u>	<u>0.11</u>	<u>-155.4</u>	<u>clear</u>	<u>3.60</u>	<u>6.10</u>	
1111	End Purge	—	—	—	—	—	—	—	—	—	—	—
1115	Sample	—	—	—	—	—	—	—	—	—	—	—
1120	Vacated well	—	—	—	—	—	—	—	—	—	—	—

Fe+2 (ppm) — Taken immediately before sampling.

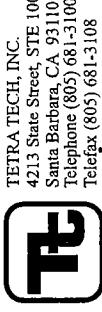
WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 8.24 FILTER LOT # —

Comments: - cleared dirt and cob grass from well and bailed water to expose top of well casing before beginning purge.

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Temperature $\pm 1^\circ \text{C}$ (1.8 F)	Conductivity $\pm 5\%$
pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

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DATE 1/22/05 SITE NUMBER 1
PROGRAM NAME B6mp TRIP BLANK I.D. VITB1146
MONITORING WELL IDENTIFICATION VBX-SNW7 Casing ID. 8X5-mus-7
SAMPLE I.D. VBX-SNW7 DUPLICATE I.D. / COLLECTION TIME 21.0
STATIC WATER LEVEL (ft boric) 7.26 TOTAL WELL DEPTH (ft boric) 30
WATER COLUMN (feet) 13.792 Casing Diameter (in) 2
WELL VOLUME (V) (gals) 2.3 BAILER BOX # 197

Time	Activity	Water Level (ft boric)	Pump Depth (ft boric)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (gals)	Well Volumes Purged	Flow Rate (GPM)
1000	Arrived at well	—	—	—	—	—	—	—	—	—	—	—	—
1010	Begin Purge	—	19.5	—	—	—	—	—	—	—	—	—	0.5
1015	10/9	22.57	840	6.56	24.8	11.09	2/6.2	Cloudy	2.5	1.0	—	—	—
1020	11.35	23.03	925	6.56	2.99	4.94	194.0	Clear	5.0	2.0	—	—	—
1025	12.27	23.57	887	6.75	3.02	3.55	137.6	Clear	7.5	3.0	—	—	—
1030	13.62	24.17	89.6	6.76	4.03	4.01	86.7	Clear	10.0	4.0	—	—	—
031	Cover Pump	20.5	21.99	—	—	—	—	—	—	—	—	—	—
1035	14.02	24.88	917	6.80	4.67	3.58	47.7	Clear	15.0	5.0	—	—	—
1040	15.11	24.68	916	6.79	2.2	3.36	22.9	Clear	20.0	6.0	—	—	—
1041	End Purge	—	—	—	—	—	—	—	—	—	—	—	—
1045	Sample	21.94	824	6.85	17.7	2.84	10.2	—	—	—	—	—	—
1050	Vacated well	—	—	—	—	—	—	—	—	—	—	—	—

Fe+2 (ppm) — Taken from first bailer immediately before sampling.
WATER LEVEL (ft boric) AT TIME OF SAMPLING: 8.21 FILTER LOT # —
Comments: 901: 10.09: b70c

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ± 1 C (1.8 F)	Conductivity $\pm 5\%$
pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

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DATE 1/21/05 SITE NUMBER 1
PROGRAM NAME B6mp TRIP BLANK I.D. VBXS TB 1142
MONITORING WELL IDENTIFICATION BxS-mw-15
SAMPLE I.D. VBX Smw15 DUPLICATE I.D. / COLLECTION TIME ~
STATIC WATER LEVEL (ft btoc) 7.07 TOTAL WELL DEPTH (ft btoc) 20.0
WATER COLUMN (feet) 12.93 Casing Diameter (in) 4
WELL VOLUME (V) (gals) 8.40 3 V (gals) 25.2 BAILER BOX # 196

Time	Activity	Water Level (ft btoc)	Pump Depth (ft btoc)	Temp (Deg. C)	EC (µhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (gals)	Well Volumes Purged	Flow Rate (GPM)
1225	Arrived at well	—	—	—	—	—	—	—	—	—	—	—	—
1233	Begin Purge	—	19.5	—	—	—	—	—	—	—	—	—	1.0
1238	9.57	22.31	23.53	6.66	2.97	0.81	53.0	clear	5.0	0.58	—	—	—
1243	11.28	22.42	23.50	6.67	2.85	0.84	53.5	clear	10.0	1.17	—	—	—
1248	13.45	22.70	23.57	6.60	2.80	0.76	27.2	clear	15.0	1.75	—	—	—
1253	14.72	23.19	23.55	6.65	7.04	0.94	25.0	clear	20.0	2.33	—	—	—
1258	16.22	23.41	24.34	6.67	3.78	1.36	28.9	clear	25.0	2.98	—	—	—
1303	17.60	23.53	24.77	6.67	2.57	1.51	31.9	clear	30.0	3.56	—	—	—
1308	18.86	23.28	24.65	6.64	2.18	1.75	35.0	clear	35.0	4.14	—	—	—
1309	2nd 4	—	—	—	—	—	—	—	—	—	—	—	—
1326	Sample 4	21.35	23.02	6.93	3.95	4.03	183.8	clear	—	—	—	—	—
1326	Vacated well	—	—	—	—	—	—	—	—	—	—	—	—

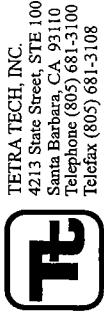
Fe+2 (ppm) ~ Taken from first bailer immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 17.56 FILTER LOT #: —

Comments: —

XLRP_DriverField_WorksField_CordinationForms10050, Field Data Log Sheet Grundfos, air mfr
Temperature $\pm 1^\circ\text{C}$ (18 F) Conductivity $\pm 5\%$
pH ± 0.1 Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

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DATE 11/21/05 SITE NUMBER 1

PROGRAM NAME VFB86mp TRIP BLANK I.D. VBXST01142

MONITORING WELL IDENTIFICATION BXS-MW-16

DUPLICATE ID. / COLLECTION TIME —

STATIC WATER LEVEL (ft boc) 5.55 TOTAL WELL DEPTH (ft boc) 20.1

WATER COLUMN (feet) 14.6 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 0.6 5 V (L) 3.0

PURGING DEVICE							MICROPURGE DEDICATED PUMP						
SAMPLING DEVICE							MICROPURGE DEDICATED PUMP						
Time	Activity	Water Level (ft boc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)	
1325	Arrived at well	—	—	—	—	—	—	—	—	—	—	—	
1334	Begin Purge	—	—	—	—	—	—	—	—	—	—	—	0.21
1337	5.71	17.42	15.77	6.40	5.50	0.98	-105.8	clear	0.63	1.1	—	—	
1340	5.74	17.34	16.46	6.43	2.33	0.71	-113.3	clear	1.26	2.1	—	—	
1343	5.79	17.31	16.67	6.44	3.25	0.48	-117.4	clear	1.89	3.2	—	—	
1346	5.82	17.36	16.75	6.44	1.50	0.38	-119.4	clear	2.52	4.2	—	—	
1347	End Purge	—	—	—	—	—	—	—	—	—	—	—	
1350	Sample	—	—	—	—	—	—	—	—	—	—	—	
1400	Vacated well	—	—	—	—	—	—	—	—	—	—	—	

Fe+2 (ppm) — Taken immediately before sampling.

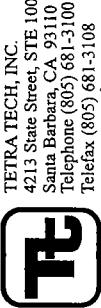
WATER LEVEL (ft boc) AT TIME OF SAMPLING: 5.82 FILTER LOT # —

Comments: -pumped 51 volumes due to unstable conductivity.
-117/110 sample

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature $\pm 1^\circ\text{C}$ (1.8 F)	Conductivity $\pm 5\%$
pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

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DATE 11/21/05 SITE NUMBER /
PROGRAM NAME B6M1P TRIP BLANK I.D. VBXSTB//42
MONITORING WELL IDENTIFICATION BXS-MW-17 DUPLICATE I.D. / COLLECTION TIME V99WS89/1730
SAMPLE I.D. VBXSMw17 STATIC WATER LEVEL (ft btoc) 5.44 TOTAL WELL DEPTH (ft btoc) 20.1
WATER COLUMN (feet) 14.7 TUBING DIAMETER (in) 3/8
PUMP & TUBING (V) (L) 0.64 5 V (L) 3.20

		PURGING DEVICE	SAMPLING DEVICE	MICRO PURGE DEDICATED PUMP

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump Tubing Volumes Purged	Flow Rate (L/PM)
1218	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1229	Begin Purge	—	—	—	—	—	—	—	—	—	—	—
1231	5.57	17.65	793	6.93	16.2	1.66	-81.3	clear	0.54	0.84	—	0.18
1234	5.58	17.58	754	6.78	12.5	1.53	-87.8	clear	1.08	1.69	—	—
1237	5.58	17.49	691	6.35	11.5	1.31	-96.6	clear	1.62	2.53	—	—
1240	5.58	17.40	665	6.35	10.9	1.02	-105.9	clear	2.16	3.38	—	—
1243	5.58	17.28	650	6.36	10.6	0.94	-109.5	clear	2.70	4.22	—	—
1246	5.58	17.39	608	6.38	10.8	0.95	-110.5	clear	3.24	5.06	—	—
1247	End Purge	—	—	—	—	—	—	—	—	—	—	—
1250	Sample	—	—	—	—	—	—	—	—	—	—	—
1306	Vacated well	—	—	—	—	—	—	—	—	—	—	—

Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 5.58

FILTER LOT # —

Comments: _____

PARAMETERS FOR WATER QUALITY STABILIZATION			
Temperature ± 1 C (18 F)	Conductivity $\pm 5\%$	pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

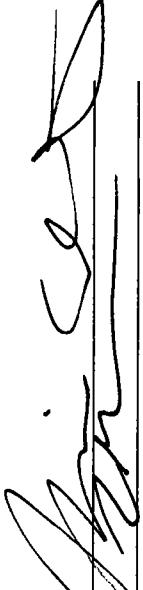
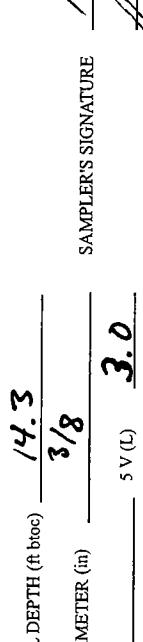


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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

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DATE 11/21/05 SITE NUMBER /
PROGRAM NAME BGMF TRIP BLANK I.D. VBX5TB1142
MONITORING WELL IDENTIFICATION 8X5-MW-18
SAMPLE I.D. VBX5MW18 DUPLICATE I.D./COLLECTION TIME —
STATIC WATER LEVEL (ft btoc) 8.45 TOTAL WELL DEPTH (ft btoc) 14.3
WATER COLUMN (feet) 5.9 TUBING DIAMETER (in) 3/8
PUMP & TUBING (V) (L) 0.6 5 V (L) 3.0

		PURGING DEVICE		MICRO PURGE DEDICATED PUMP	
		SAMPLING DEVICE		MICRO PURGE DEDICATED PUMP	
		PID READING IN CASING (ppm)	(initial) <u>0.0</u>	(vented to) <u>0.0</u>	
		PID READING IN BREATHING ZONE (ppm)	(initial) <u>0.0</u>	(vented to) <u>0.0</u>	
		SAMPLER'S SIGNATURE			
Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (umhos/cm)	pH
<u>0955</u>	Arrived at well	—	—	—	—
<u>1010</u>	Begin Purge	—	—	—	—
<u>1013</u>	8.69	17.42	1566	6.09	11.1
<u>1016</u>	8.71	17.45	1566	6.10	10.1
<u>1019</u>	8.74	17.43	1565	6.11	8.02
<u>1022</u>	8.76	17.44	1569	6.14	10.6
<u>1025</u>	8.79	17.47	1575	6.17	7.10
<u>1026</u>	End Purge	—	—	—	—
<u>1030</u>	Sample	—	—	—	—
<u>1038</u>	Vacated well	—	—	—	—

Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 8.80

FILTER LOT # —

Comments: _____

PARAMETERS FOR WATER QUALITY STABILIZATION			
Temperature $\pm 1^\circ\text{C}$ (1.8 F)	Conductivity $\pm 5\%$	pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

Page 1 of 1

DATE	PROGRAM NAME	SITE NUMBER	PURGING DEVICE	2" SUBMERSIBLE GRUNDEOS PUMP			
MONITORING WELL IDENTIFICATION	TRIP BLANK I.D.	V BX5-MW-19	SAMPLING DEVICE	DISPOSABLE TEFILON BAILER			
SAMPLE I.D.	V BX5-MW-19	DUPPLICATE I.D. / COLLECTION TIME	PID READING IN CASING (ppm)	(initial)	0.0	(vented to)	0.0
STATIC WATER LEVEL (ft btoc)	6.78	TOTAL WELL DEPTH (ft btoc)	PID READING IN BREATHING ZONE (ppm)	(initial)	0.0	(vented to)	0.0
WATER COLUMN (feet)	13.3	CASING DIAMETER (in)	SAMPLER'S SIGNATURE	<i>Brian D. Sogoloski</i>			
WELL VOLUME(V) (gals)	8.64	3 V (gals)	BAILER BOX #	196			
Time	Activity	Water Level (ft btoc)	Pump Depth (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)
1110	Arrived at well	—	—	—	—	—	—
1125	Begin Purge	15.0	—	—	—	—	—
1130	8.98	23.23	2086	6.82	2.40	0.93	87.6
1135	10.02	22.88	1947	6.28	3.15	0.99	62.0
1140	11.71	22.70	1895	6.29	2.24	0.90	47.7
1145	12.72	22.77	1860	6.30	2.38	0.93	41.0
1150	13.62	22.97	1957	6.35	2.73	1.29	37.9
1151	Cover Pump	11.5	—	—	—	—	—
1155	11.43	23.02	1997	6.37	3.75	1.78	46.8
1200	13.61	22.02	2125	6.92	5.07	1.34	38.6
1204	well DRY	—	—	—	—	—	—
1215	Sample	—	21.64	2169	6.97	6.07	3.95
1220	Vacated well	—	—	—	—	—	—

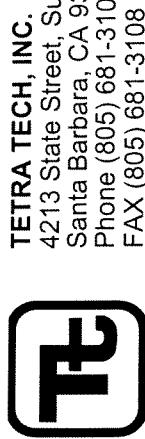
Fw+2 (ppm) — Taken from first bailer immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 17.02 FILTER LOT #: 354.20

Comments:

PARAMETERS FOR WATER QUALITY STABILIZATION			
Temperature	±1 °C (1.8 F)	Conductivity	±5%
pH	±0.1	Turbidity	5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.



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SHIPPED TO: EMAX Labs
1835 West 205th Street
Torrance, CA 90501
D4/rW01-93/94

CHAIN OF CUSTODY RECORD

05/18/94
1 / DATE 11/21/05 PAGE 1 OF 2

CLIENT	Vandenberg AFB	ANALYTICAL METHODS			NUMBER OF CONTAINERS	MATRIX TYPE	CONTAINER TYPE	NUMBER OF CONTAINERS	FILTERED SAMPLE	OBSERVATIONS/COMMENTS:	TURNAROUND TIME:
		PROJECT NAME	TC#	SAMPLES (Signatures)							
PROJECT MANAGER	Kevin McNamara		T99105-06								
SAMPLE NO.											
1. VBXSMW3			11/21/94	1415							
2. VBXSMW15				1320							
3. VBXSMW2				1505							
4. V99W589				1730							
5. VBXSMW16M				1350							
6. VBXSMW17				1250							
7. VBXSMW18				1030							
8. VBXSMW6				1115							
9. V99W588				1725							
10. VBXSMW1				1200							
MATRIX TYPE:	S = Soil W = Water SD = Sediment	CONTAINER TYPE:	G = Glass SS = Stainless Steel P = Plastic	PRESERVATIVES:	T = 3, 0°C	TEMPERATURE BLANK				TOTAL NUMBER OF CONTAINERS	
RELINQUISHED BY:	Jennifer Higgins	SIGNATURE:	E = Encore	SS = Stainless Steel Water samples are preserved at 4°C. All samples are preserved as indicated on the sample labels.	TETRA TECH, INC.	COMPANY:	DATE: 11/22/05	TIME: 10:15	METHOD OF SHIPMENT: <i>Crated</i>	72 of 96	
RECEIVED BY:	George Jim	SIGNATURE:	L			COMPANY: TMAX	DATE: 11/22/05	TIME: 10:15			
RELINQUISHED BY:	George Jim	SIGNATURE:	L			COMPANY: TMAX	DATE: 11/22/05	TIME: 12:15	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:		
RECEIVED BY:	Sitvinov	SIGNATURE:				COMPANY: TMAX	DATE: 11/22/05	TIME: 13:15			



TETRA TECH, INC.
 4213 State Street, Suite 100
 Santa Barbara, CA 93110
 Phone (805) 681-3100
 FAX (805) 681-3108

SHIPPED TO:

EMAX Labs

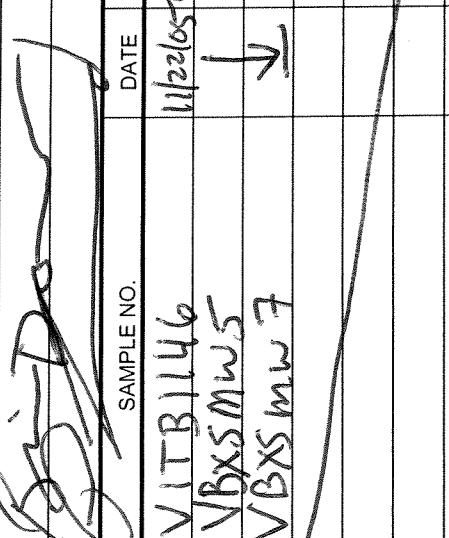
1835 West 205th Street

Torrance, CA 90501

05/1/93

CHAIN OF CUSTODY RECORD

VNO1-41

CLIENT	Vandenberg AFB	ANALYTICAL METHODS			TURN-AROUND TIME: Standard	OBSERVATIONS/COMMENTS:
		PROJECT NAME	TC#	SITE		
PROJECT MANAGER	Kevin McNamara					
TC#	T99105-06					
SAMPLES (Signatures)						
X	X	SAMPLE NO.	DATE	TIME		
1. VITB1146		11/22/05	0810			
2. VBXSMW5			1130			
3. VBXSMW7			1145			
						
MATRIX	S = Soil	CONTAINER TYPE:	G = Glass	PRESERVATIVES:	TEMPERATURE:	TOTAL NUMBER OF CONTAINERS
TYPE:	W = Water	COMPANY:	SS = Stainless Steel	All samples are preserved at 4° C.	BLANK	14
SD = Sediment	E = Encore	SIGNATURE:	P = Plastic	Water samples are preserved as indicated on the sample labels.	EACH COOLER: YES	NO
RELINQUISHED BY:	SIGNATURE:	TETRA TECH, INC.	DATE:	TIME:	METHOD OF SHIPMENT	
RECEIVED BY:	SIGNATURE:	COMPANY:	DATE:	TIME:		
RELINQUISHED BY:	SIGNATURE:	COMPANY:	DATE:	TIME:	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:	
RECEIVED BY:	SIGNATURE:	COMPANY:	DATE:	TIME:		

T = 3.302